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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,508	12/22/2005	Georges Belfort	18001/5044	6237

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Michael L Goldman
Nixon Peabody
Clinton Square
P O Box 31051
Rochester, NY 14603-1051

EXAMINER	
DRODGE, JOSEPH W	
ART UNIT	PAPER NUMBER
1797	
MAIL DATE	DELIVERY MODE
12/23/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/524,508	BELFORT ET AL.	
	Examiner	Art Unit	
	Joseph W. Drodge	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 November 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-79* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-79* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/13/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

The indicated allowability of claims 1-79 is withdrawn in view of the newly discovered reference(s) to the Yoon et al publication in combination with prior art of record. Rejections based on the newly cited reference(s) follow.

Claims 1-79 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. For each of the independent claims, the recitations of "optimizing conditions for filtration" , upon further consideration, is now deemed vague and indefinite; it is unclear whether such refers to characteristics of feeding the dispersion, or merely in setting criteria for design and material selection of membrane used in the process.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-79 are rejected under 35 U.S.C. 103(a) as obvious over the Romero et al Journal of Membrane Sciences publication (of record) in view of the Dharmappa et al Journal of Membrane Sciences publication (of record) and the newly cited Yoon et al Publication Full Text Publication and Accompanying Abstract (both newly cited, hereafter Yoon).

For independent claims 1,30 and 40, Romero et al disclose a crossflow membrane filtration of particles process and a poly-disperse suspension (pages 157-159,163) and disclose or suggest determination of the following: permeation flux (page 168,180), target molecule yield (page 183), viscosity (top of page 163), packing density (page 167 and 174-175), selection of smallest particle size (page 178 and figures 10 and 11), selection of largest particle size giving relative permeation flux rates (bottom of page 180), packing densities of smallest particles and larger particles (page 167 and 174-175), and estimated yield/sieving coefficient (page 183, etc.).

Romero also discloses to optimize filtration conditions based on consideration of such parameters and upon completing modeling and calculations by varying the proportion of large particles in the suspension fed (page 183) and varying effected shear by varying rate of feeding the suspension (pages 172-173) to regulate flux, especially permeate flux.

The claims all differ in requiring that packing densities and/or packing volume be determined for all or each of the particle sizes present. However Dharmappa et al teach such determination concerning particle size distributions at pages 180,182 and 183. Additionally, Yoon teaches to consider packing structure, size distributions, and packing deposition rates for all size particles of a poly-disperse suspension in the calculations of speed and extent of cake layer formation and buildup (Sections 2.1, 2.5 and 2.6) It would have been obvious to one of ordinary skill in the art to have utilized such calculation(s) in the process of Romero, to allow determination of yield and passage of multiple products of the feed flow mixture corresponding to different particles of intermediate or different particle size. It would have also been obvious to include such parameters in the calculations as taught by Yoon to predict changes in flux due to changing rate and extent of cake formation.

Claim 1 also requires determination of back-transport velocity although Romero discusses back diffusion. Dharmappa teaches such determination at pages (especially pages 176-177). Yoon determines back-transport velocities as a function of particle size in the determination of effective particle deposition velocity (Section 2.1). Such further calculation would enable correction of determination of apparent flux to reflect actual , more accurate and corrected overall flux rates,. and also to determine particle deposition velocity as a function of back-transport velocity in view of Yoon.

If necessary, Dharmappa also teaches to utilize findings of modeling and simulation to later optimize crossflow filtration operating conditions including varying of pressure and other operating parameters (Conclusions and columns bridging pages 182-183).

For various dependent claims: Romero further suggests determination of factors related to particle shape and volume fraction, inertial lift (pg. 158), particle diffusion (pg 158), use of Boltzmann constant, determination of a wide range of particle sizes, particle size radius (section 2.1), Brownian diffusion (pg. 158) , sieving coefficient, ,calculations related to diafiltration such as cake factors , shear rates (figure 1 and pg 160), repeating of various calculations and assumptions, stagnation film formation.

For various dependent claims: Dharmappa further suggests determination of factors related to particle shape and volume fraction, inertial lift, particle diffusion, use of Boltzmann constant, determination of a wide range of particle sizes, particle size radius, Brownian diffusion properties, pore radius or diameter, sieving coefficient, ,calculations related to diafiltration such as cake factors, shear rates, repeating of various calculations and assumptions (Table 2), stagnation film formation. See especially the discussion starting at page 180 concerning particle size distribution at the foulant layer.

For claims 26-29, 39 and 64-79, Dharmappa further discloses micro- and ultra-filtration , different filtration shapes and forms, and widely varying types of filtration processes concerning different sources of waste-water and industrial fluids being purified. See introduction at page 173

For claims 26-29, 39 and 64-79, Romero further discloses micro- and ultra-filtration , different filtration shapes and forms, and widely varying types of filtration processes concerning different sources of waste-water and industrial fluids being purified. See Introduction at page 157

Applicant's arguments filed on 05/01/2009 have been fully re-considered but they are not persuasive. It is argued that neither Romero or Dharmappa examines any of particle capture, subsequent cake formation or transport through a formed cake layer. Figure 2 and accompanying

discussion at page 161 of Romero concern gradual buildup and expansion of formed cake layer for a flowing cake type crossflow microfiltering system. Also newly cited Yoon demonstrates that the major flux controlling parameter for multi-dispersed particle disperions is cake resistance and buildup of cake (Sections 2.6, 2.7 and 5).

It is also argued that Romero never considers individual particles in calculation of mass balances ; and additionally fails to relate solute flow or retention to permeation flux. It is submitted that Romero emphasizes concern with rate of buildup of cake layer or solute retention with respect to slow long-term declines in permeation flux (top of page 158) and considers properties of relatively large particles relative to smaller particles at bottom of page 158.

It is argued that the teachings of Dharmappa are non-analagous, since he estimates parameters, especially rate of change of foulant layer thickness with respect to time experimentally or semi-empirically. There is nothing in the instant claim language to preclude modeling and experimental simulation of crossflow membrane filtration to enable later optimization of actual cross-flow applications based on findings from the simulation, as is clearly taught in the Conclusions of Dharmappa bridging pages 282-283. Also, it is argued that Dharmappa fails to relate particle capture and subsequent time-dependent buildup of porous cake with prediction of transport of fluid and solute. (Again see Yoon at Sections 2.6, 2.7 and 5 and aforementioned text sections of Romero).

Any inquiry concerning this communication or earlier communications from

the examiner should be directed to Joseph Drodge at his direct government telephone number of 571-272-1140. The examiner can normally be reached on Monday-Friday from approximately 8:30 AM to 12:30 PM and 2:00 PM to 6:00 PM.

Alternatively, to contact the examiner, send a communication via E-mail communication to the Examiner's Patent Office E-mail address: "Joseph.Drodge@uspto.gov". Such E-main communication should be in accordance with provisions of MPEP (Manual of Patent Examination Procedures) section 502.03 & related MPEP sections. E-mail communication must begin with a statement authorizing the E-mail communication and acknowledging that such communication is not secure and will be made of record, under Patent Internet Usage Policy Article 5. A suggested format for such authorization is as follows: "Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with me concerning any subject matter of this application by electronic mail. I understand that a copy of these communications will be made of record in the application file.

Additionally, the examiner's supervisor, Duane Smith, of Technology Center Unit 1797, can reached at 571-272-1166.

The formal facsimile phone number, for official, formal communications, for the examining group where this application is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either private PAIR or Public PAIR, and through Private PAIR only for unpublished applications. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you

have any questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

JWD
12/14/2009
/Joseph W. Drodge/
Primary Examiner, Art Unit 179